Avaya Solution & Interoperability Test Lab

Application Note for Configuring the Ascom Wireless IP-DECT SIP Solution with an Avaya Aura™ Telephony Infrastructure using Avaya Aura™ Communication Manager Branch in a Converged Voice over IP and Data Network - Issue 1.0

Abstract

These Application Notes describe a solution for supporting wireless interoperability between the Ascom wireless IP-DECT SIP solution with an Avaya Aura™ Telephony Infrastructure consisting of Avaya Aura™ Communication Manager Branch in a converged Voice over IP and Data Network. Emphasis of the testing was placed on verifying good voice quality of calls with Ascom wireless IP-DECT SIP handsets registered to the Avaya telephony infrastructure.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

These Application Notes describe the configuration process necessary to provide interoperability between the Ascom wireless IP Digital Enhanced Cordless Telecommunications (IP-DECT) Solution with an Avaya Aura™ Telephony Infrastructure using Avaya Aura™ Communication Manager Branch.

1.1. Interoperability Compliance Testing

The compliance testing focused on verifying interoperability of the Ascom wireless IP-DECT SIP Solution comprised of the Ascom wireless IP-DECT Base Station and Ascom wireless DECT Handsets with an Avaya Aura™ Telephony Infrastructure consisting of Avaya Aura™ Communication Manager Branch in a converged Voice over IP and Data Network. Additional testing verified proper operation with the Avaya 1616 Telephone (H.323), the Avaya 9620 IP Telephone (SIP), the Avaya 2420 Digital Telephone and Voicemail with MWI.

Avaya's formal testing and Declaration of Conformity is provided only on the headsets/handsets that carry the Avaya brand or logo. Avaya may conduct testing of non-Avaya headsets/handsets to determine interoperability with Avaya telephones. However, Avaya does not conduct the testing of non-Avaya headsets/handsets for: Acoustic Pressure, Safety, Hearing Aid Compliance, EMC regulations, or any other tests to ensure conformity with safety, audio quality, long-term reliability, scalability or any regulation requirements. As a result, Avaya makes no representations whether a particular non-Avaya headset will work with Avaya's telephones or with a different generation of the same Avaya telephone.

Since there is no industry standard for handset interfaces, different manufacturers utilize different handset/headset interfaces with their telephones. Therefore, any claim made by a headset vendor that its product is compatible with Avaya telephones does not equate to a guarantee that the headset will provide adequate safety protection or audio quality.

1.2. Ascom IP-DECT Base Station

The Ascom IP-DECT system is a modular solution for large and small deployments with full handover capabilities with one PBX. The Ascom IP-DECT Base Station works as a conduit between the Avaya Aura™ Communication Manager Branch and the Ascom IP-DECT wireless handsets. After the Ascom IP-DECT wireless handsets register with the Ascom IP-DECT Base Station, the Base Station registers the handsets to Avaya Aura™ Communication Manager Branch.

1.3. Support

Technical support for the Ascom Wireless IP-DECT Handset can be obtained through local Ascom suppliers.

Ascom global technical support:
Phone: +46 31 559450
Email: support@ascom.se

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2. Reference Configuration

The network diagram shown in **Figure 1** illustrates the testing environment used for compliance testing. The network consists of an Avaya Aura™ Communication Manager Branch, one Avaya 1616 IP Telephone (H.323), one Avaya 9620 IP Telephone (SIP), two Ascom Wireless IP-DECT Base Stations, one Ascom d62 Wireless IP-DECT Handset and one Ascom d41 Wireless IP-DECT Handset. One computer is present in the network providing network services such as DHCP, TFTP and HTTP.

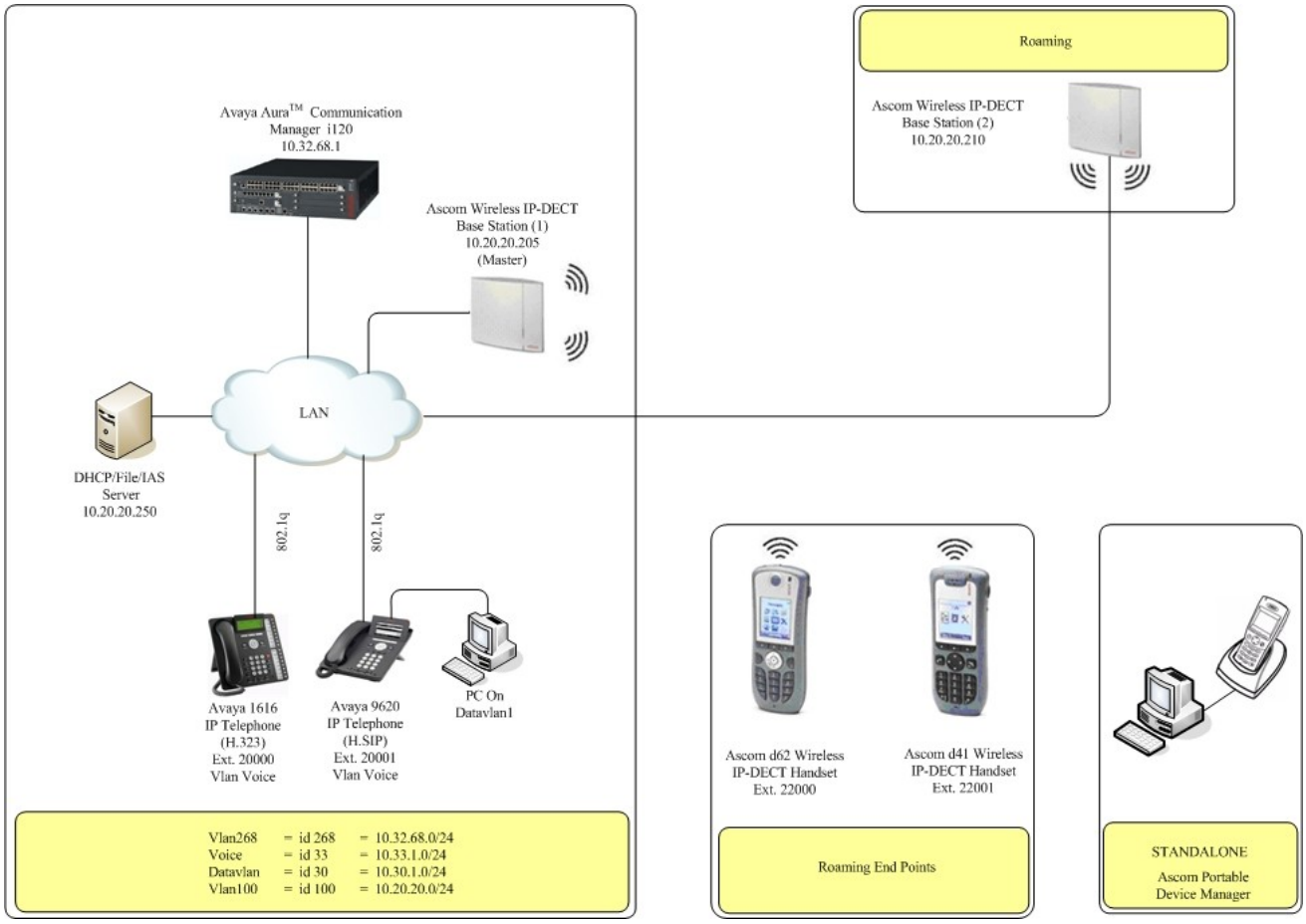

Figure 1: Sample Network Diagram

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3. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Software/Firmware
Avaya PBX Products	
Avaya Aura™ Communication Manager Branch	2.0.0_28.01
Avaya Telephony Sets	
Avaya 1600 Series IP Telephones	Avaya one-X Deskphone Value Edition 1.020
Avaya 9600 Series IP Telephones	Avaya one-X Deskphone SIP 2.4
Ascom Products	
Ascom Wireless IP-DECT Base Station	IPBS(3.2.2)
Ascom d62 Wireless IP-DECT Handset	2.8.22
Ascom d41 Wireless IP-DECT Handset	2.8.22
Ascom Device Manger (WinPDM)	3.3.5
MS Products	
DHCP / File / IAS server	Microsoft Windows 2003 Server

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4. Avaya Aura™ Communication Manager Branch Configuration

Avaya Aura™ Communication Manager Branch is administered via a web interface. In the sample network the Avaya Aura™ Communication Manager Branch was assigned the IP address 10.32.68.1 and the URL http://10.32.68.1 was used to access the administration interface. For information on how to access and setup a factory default system, refer to [**1**].

4.1. Configure QoS

IP networks were originally designed to carry data on a best-effort delivery basis, which meant that all traffic had equal priority and an equal chance of being delivered in a timely manner. As a result, all traffic had an equal chance of being dropped when congestion occurred. QoS is now utilized to prioritize VoIP traffic and should be implemented throughout the entire network.

In order to achieve prioritization of VoIP traffic, the VoIP traffic must be classified. Avaya Communication Manager Branch and Avaya IP telephones support both 802.1p and DiffServ.

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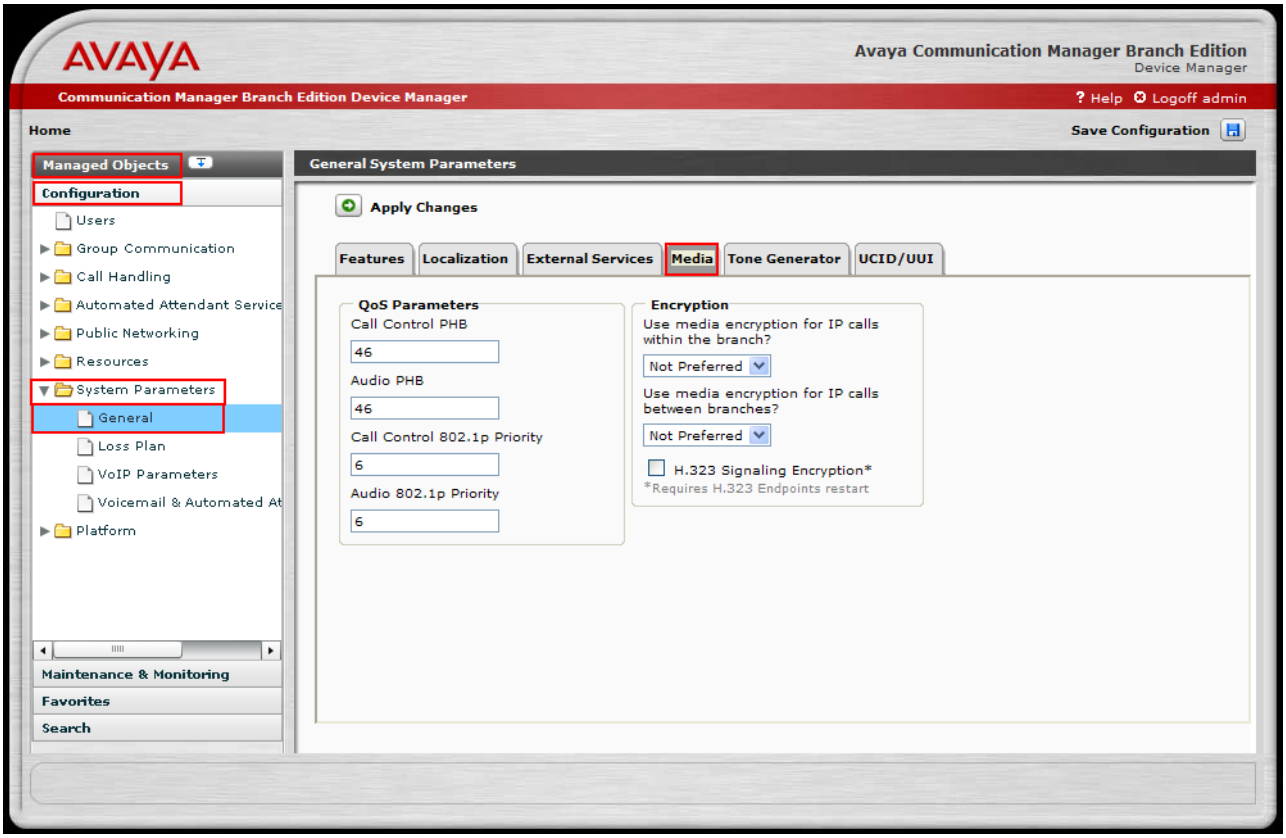
Description

Navigate to the **General System Parameters** window, from **Managed Objects**, click **Configuration→ System Parameters → General → Media.** Set the following **QoS Parameters:**

- **Call Control PHB: 46**
- **Audio PHB: 46**
- **Call Control 802.1p Priority: 6**
- **Audio 802.1p Priority**: **6**



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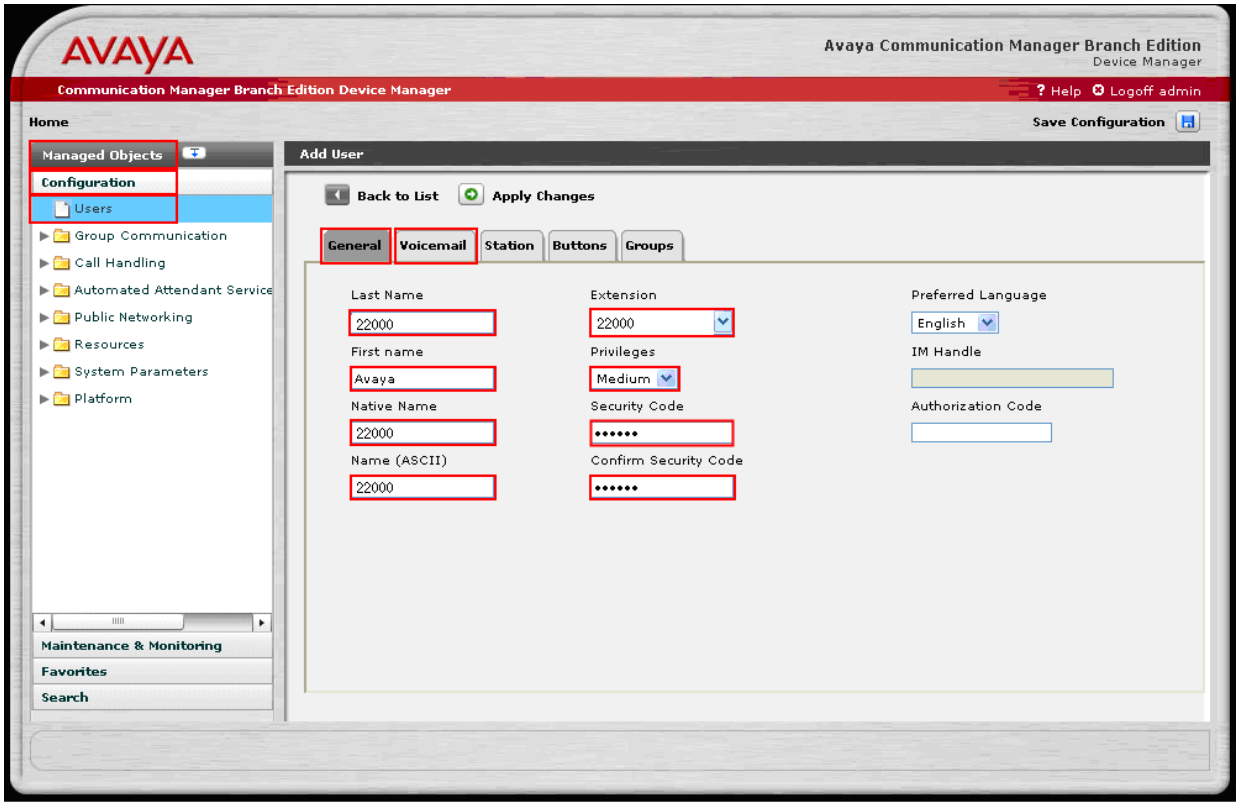
4.2. Configure Station

Step	Description
1.	Navigate to the **Add User** window, from **Managed Objects**, click **Configuration→Users → Add New User**. Enter the values displayed below and then click **Apply Changes**. **Last Name**, **First name** and **Native Name** can be any descriptive text that identifies this user. **Name (ASCII)** may be populated with the same information that is entered in **Native Name**. Enter the **Security Code** and **Confirm Security Code information**. Use the drop-down list for **Extension** and select any available extension. The remaining parameters were left at the default values. Select the **Voicemail tab** to continue. 

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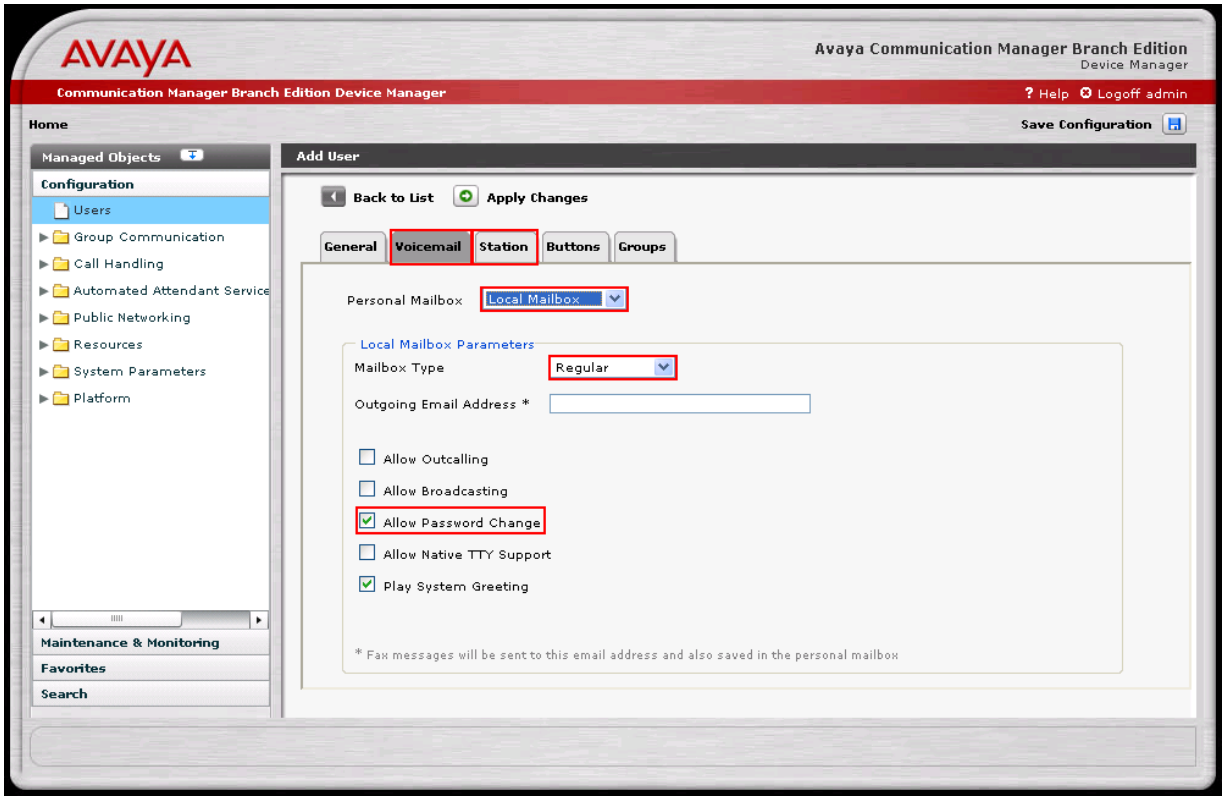
Step	Description
2.	Use the drop-down list for **Personal Mailbox** and select **Local Mailbox**. Use the drop-down list for **Mailbox Type** and select **Regular.** Check the **Allow Password Change** check box Press the **Station** tab to continue. 

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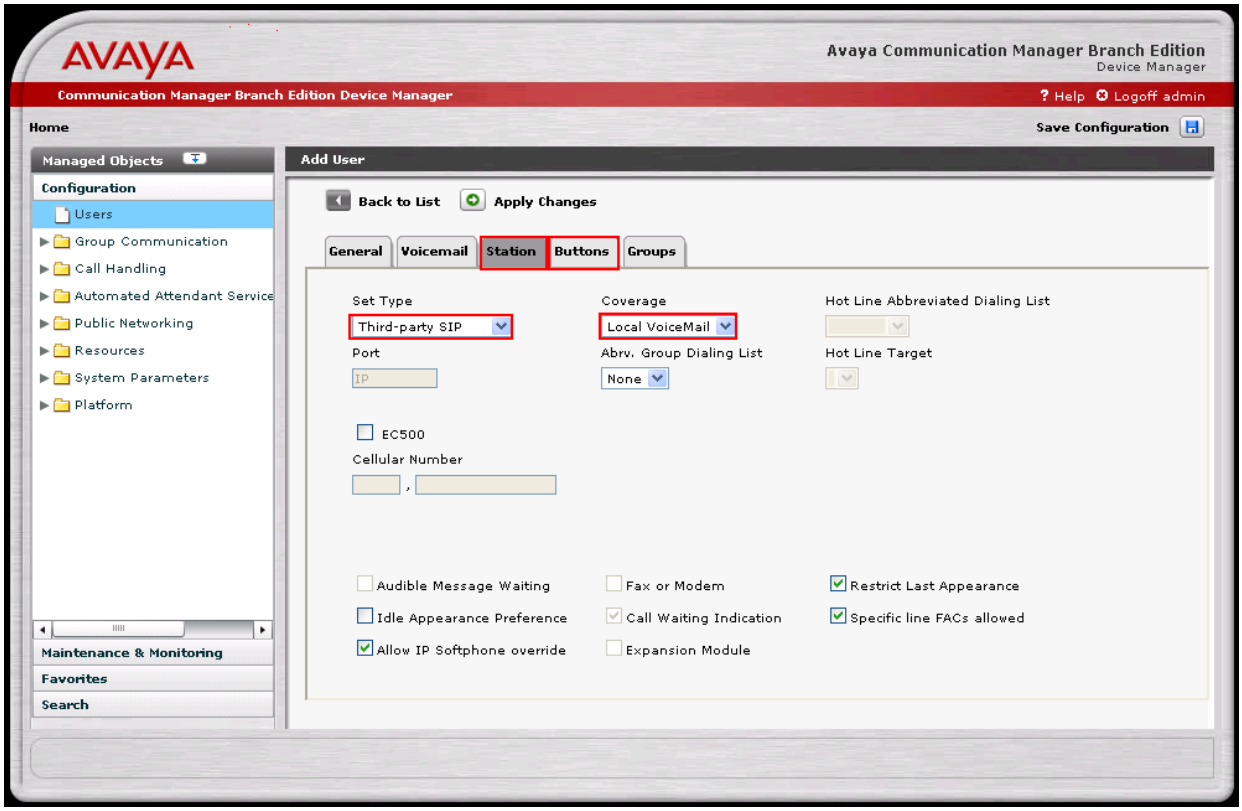
Step	Description
3.	Use the drop-down list for **Set Type** to select **Third-party SIP** and use the drop-down list for **Coverage** to select **Local Voicemail**. The remaining parameters were left at the default values. Press the **Buttons** tab to continue. 

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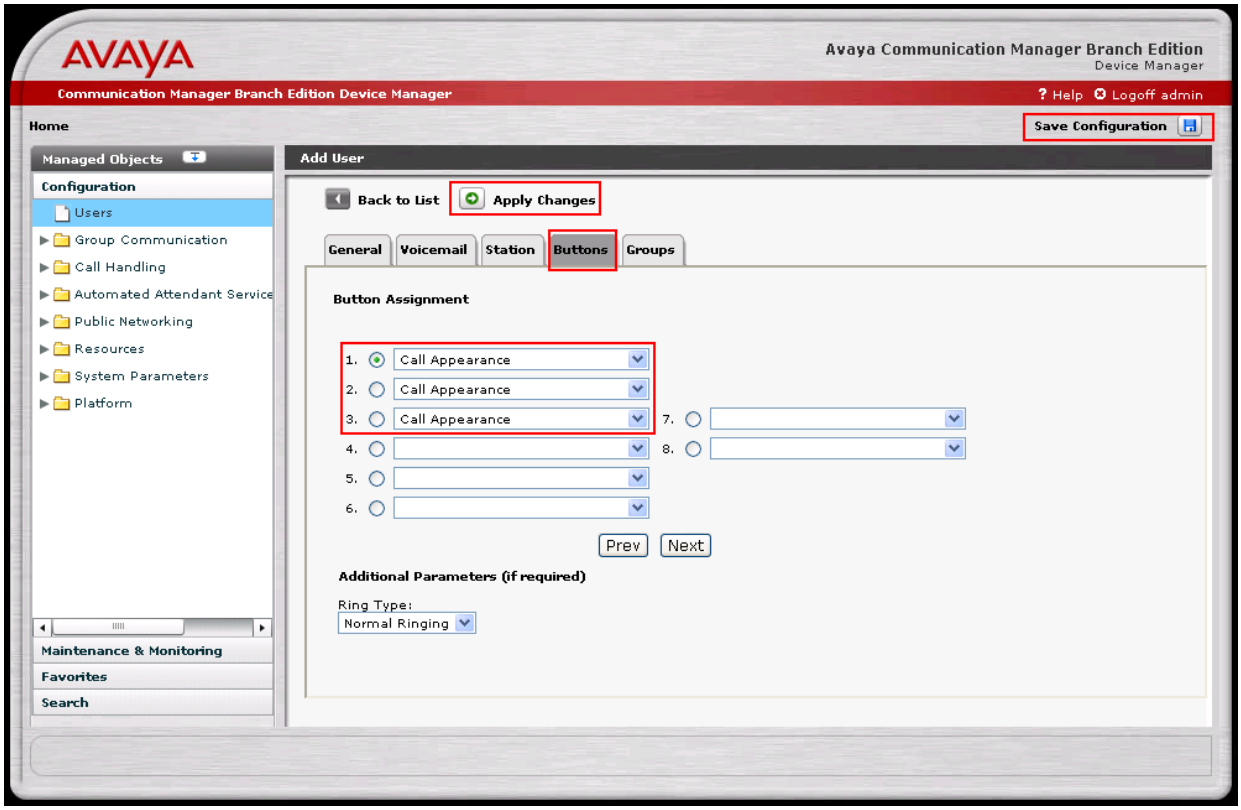
Step	Description
4.	Use the drop list for **Button Assignment 1 – 3** and select **Call Appearance**. The remaining parameters were left at the default values. Click **Apply Changes** and then click **Save Configuration**. Note the user may receive a message indicating the system is busy if **Save Configuration** is clicked immediately after **Apply Changes**. If that occurs, simply click **Save Configuration** after one or two minutes. 
5.	Repeat Steps 1 thru 4 for each Ascom IP-DECT Handset.

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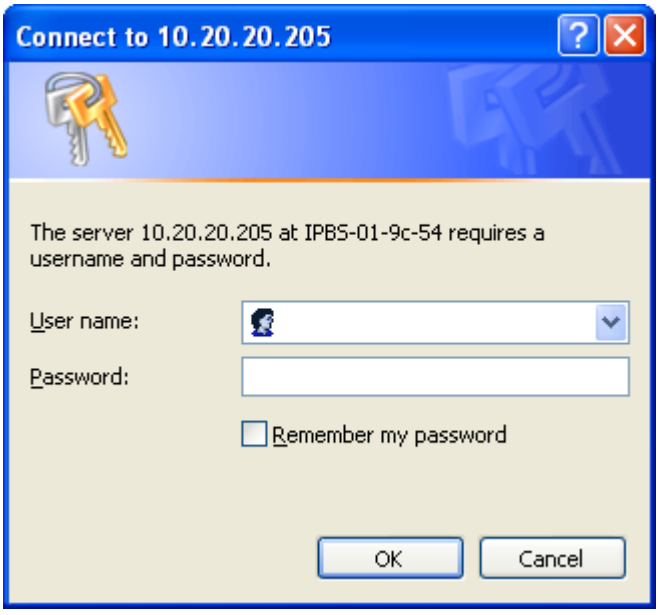
5. Configure Ascom wireless IP-DECT SIP Solution

The following steps detail the initial configuration for the Ascom Wireless IP-DECT SIP Solution. Log onto the Ascom wireless IP-DECT Base Station via web browser using the following URL format: http://IPBS-XX-XX-XX, where XX-XX-XX are the last 3 bytes of the MAC address of the Ascom wireless IP-DECT Base Station. For example, an Ascom wireless IP-DECT Base Station with a MAC address of 00-01-3E-00-CB-DB could be accessed using http://IPBS-00-CB-DB or via the Base Station IP address assigned by DHCP server.

5.1. Configure IP-DECT Base Station

The Ascom wireless IP-DECT Base Stations can be configured in a Master/Standby Master scenario to provide redundancy or to extend the radius of coverage (roaming). The following configuration steps detail the configuration process used to configure an Ascom wireless IP-DECT Base Station in Master mode only.

Roaming between multiple Ascom Wireless IP-DECT Base Stations as shown in Figure 1 was tested but the configuration setup will not be shown in this document. Refer to [**4**] for information on how to configure roaming.

Step	Description
1.	Launch a web browser and enter either the IP address, (obtained from the DHCP server) or http://IPBS-XX-XX-XX as shown in **Section 5** into the URL. The user will be presented with a login screen. Refer to [**4**] for appropriate credentials needed to access the Ascom wireless IP-DECT Base Station. Enter the appropriate login information and then click **OK**. 

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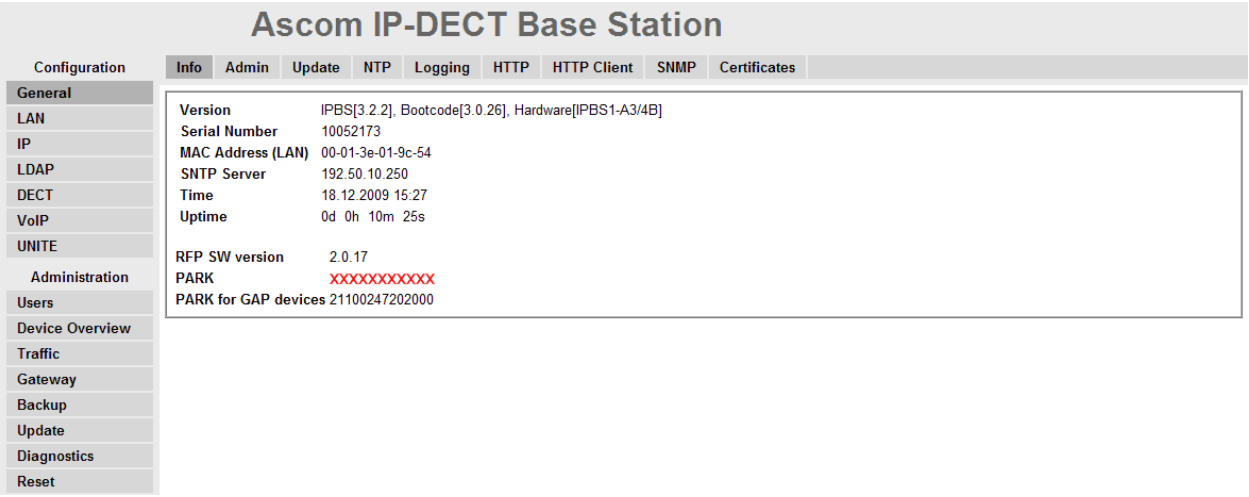
Step	Description
2.	The user is presented with the **General Info** frame where the system information for the Ascom wireless IP-DECT Base Station is displayed. 

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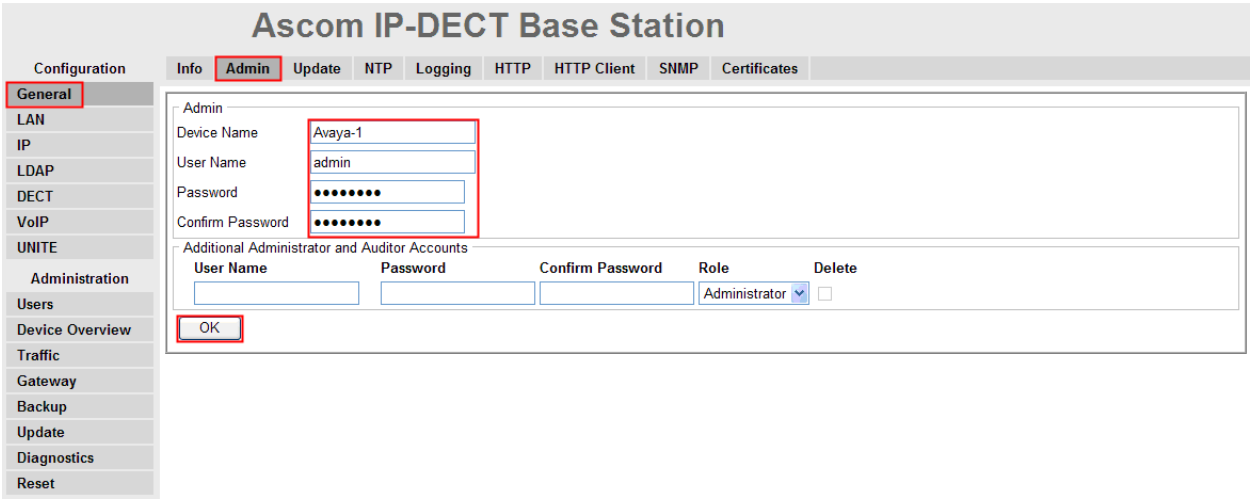
Step	Description
3.	The web interface on the Ascom wireless IP-DECT Base Station consists of a series of frames selected by a two-click process, where a category and then an option are clicked. Categories are found below **Configuration**, which is displayed in the top left portion of the frame, and options are found to the right. Navigate to the **General Admin** frame by clicking **General** and then clicking **Admin**. Configure the fields displayed below and then click **OK**. The **Device Name** can be any descriptive name that identifies this Ascom wireless IP-DECT Base Station. In the sample network the name "Avaya-1" was chosen. The **User Name** and **Password** fields were populated using the default credentials. The box below **Password** is to confirm the password and the value entered for the **Password** field must be entered here. Click **OK** to continue. 

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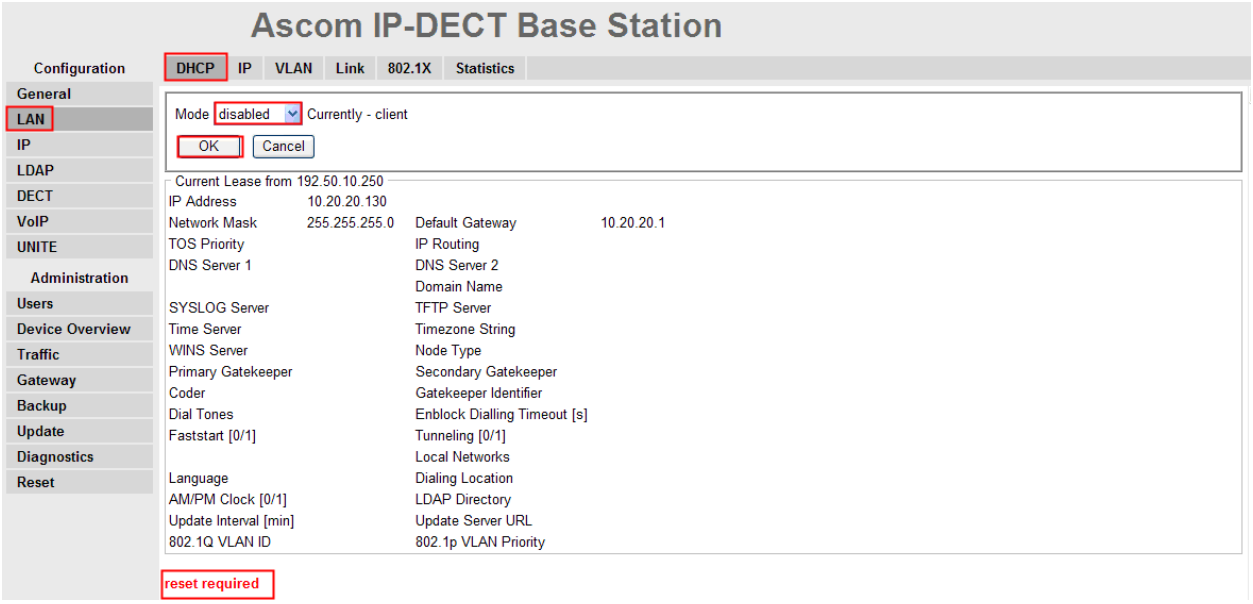
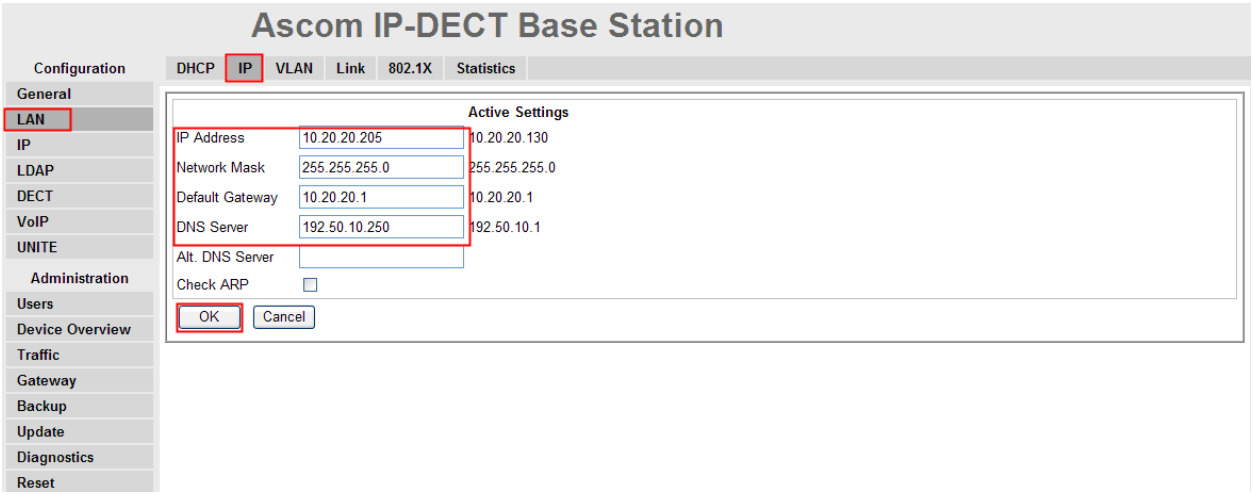
Step	Description
4.	Navigate to the **LAN DHCP** frame by first clicking **LAN** and then clicking **DHCP**. Using the drop-down list, set **Mode** to "disabled" and then click **OK**. This will present the user with the clickable red text which reads "reset required". Click **IP** tab to continue to the **LAN IP** frame**.** 
5.	Set the static **IP Address**, **Network Mask**, **Default Gateway** and **DNS Server**, and click **OK.** Click **VLAN** to continue. 

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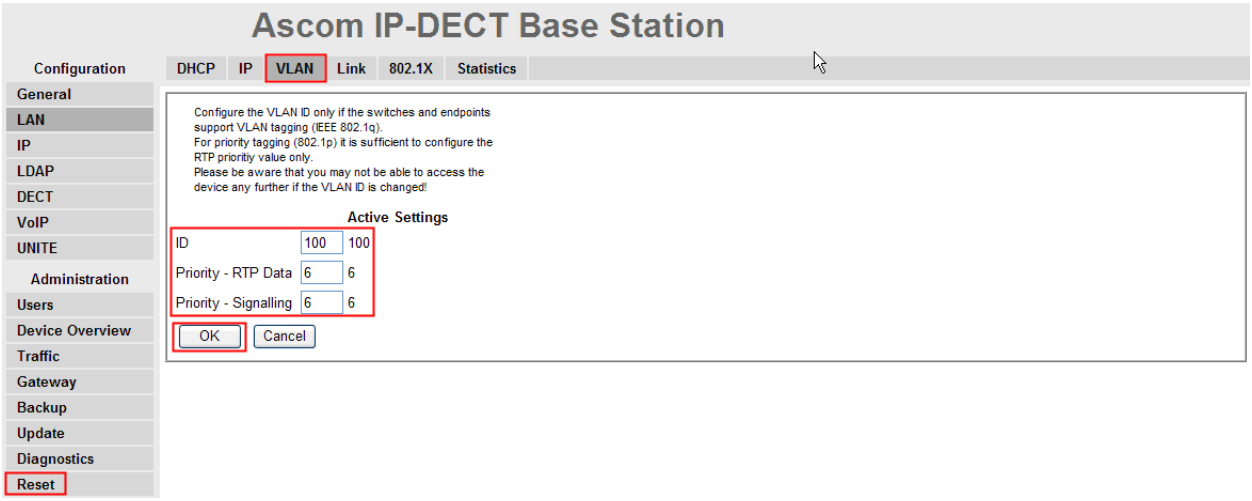
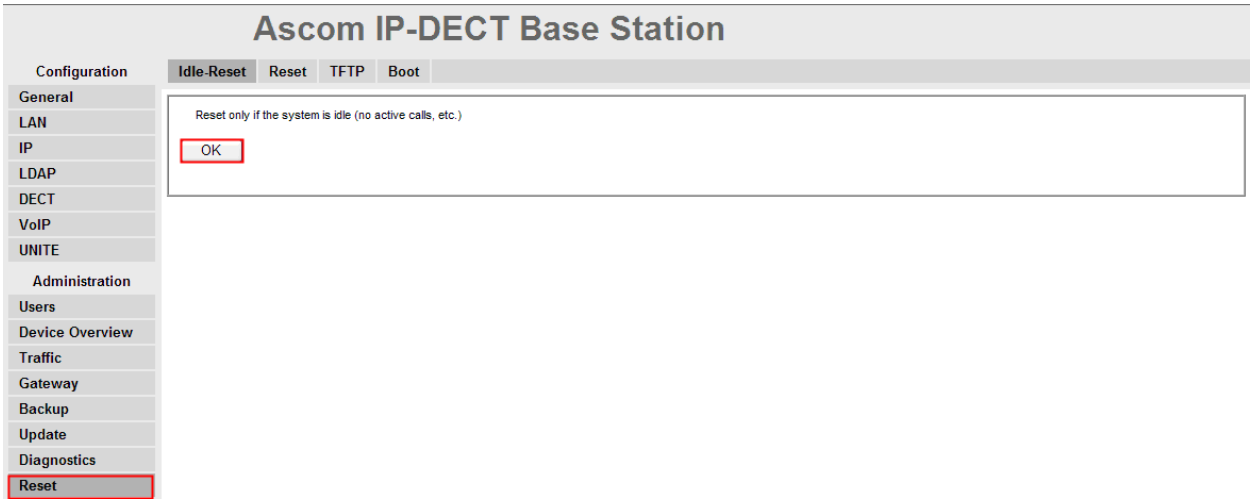
Step	Description
6.	Set the **ID, Priority – RTP Data** and **Priority – Signalling**, and click **OK.** Click **Reset** to continue. 
7.	Click **OK** to initiate the system reset. Many of the other changes made to the system during the configuration process require a reboot. **Repeat this process whenever a reset is required**. 

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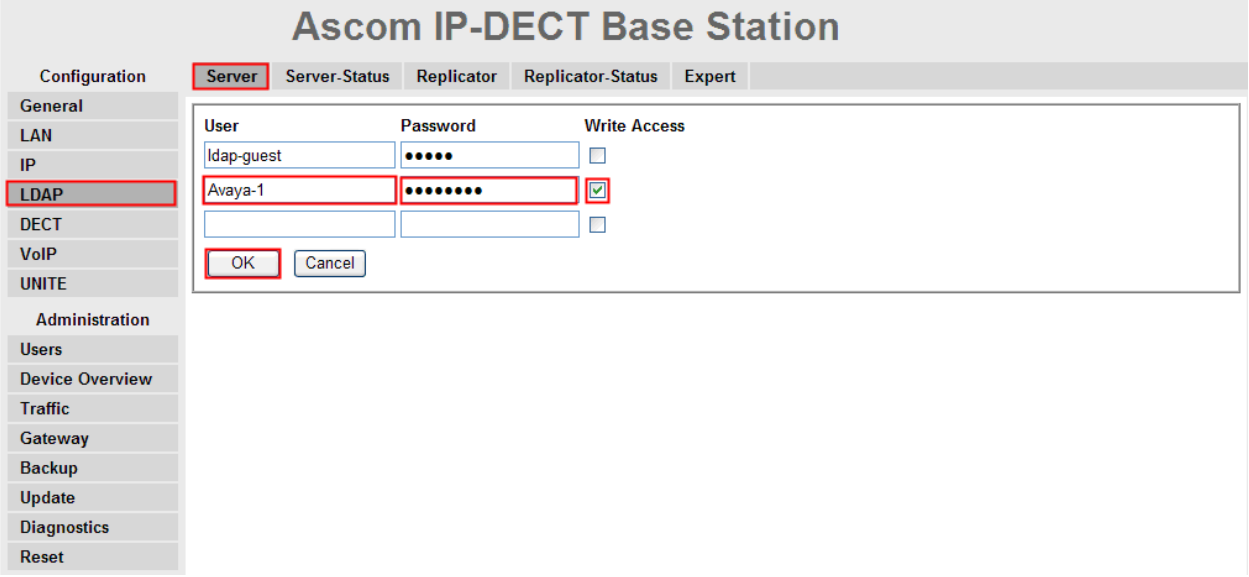
Step	Description
8.	After the Ascom wireless IP-DECT Base Station (**Avaya-1**) has rebooted, navigate to the **LDAP Server** frame by clicking **LDAP** and then clicking **Server**. The "ldap-guest" account is a default system account. Configure **User** using the **Device Name** used in **Step 3**. Configure the **Password** field with the **Password** used in **Step 3.** Check the **Write Access** check box for the "Avaya-1" user account and then click **OK** to continue. 

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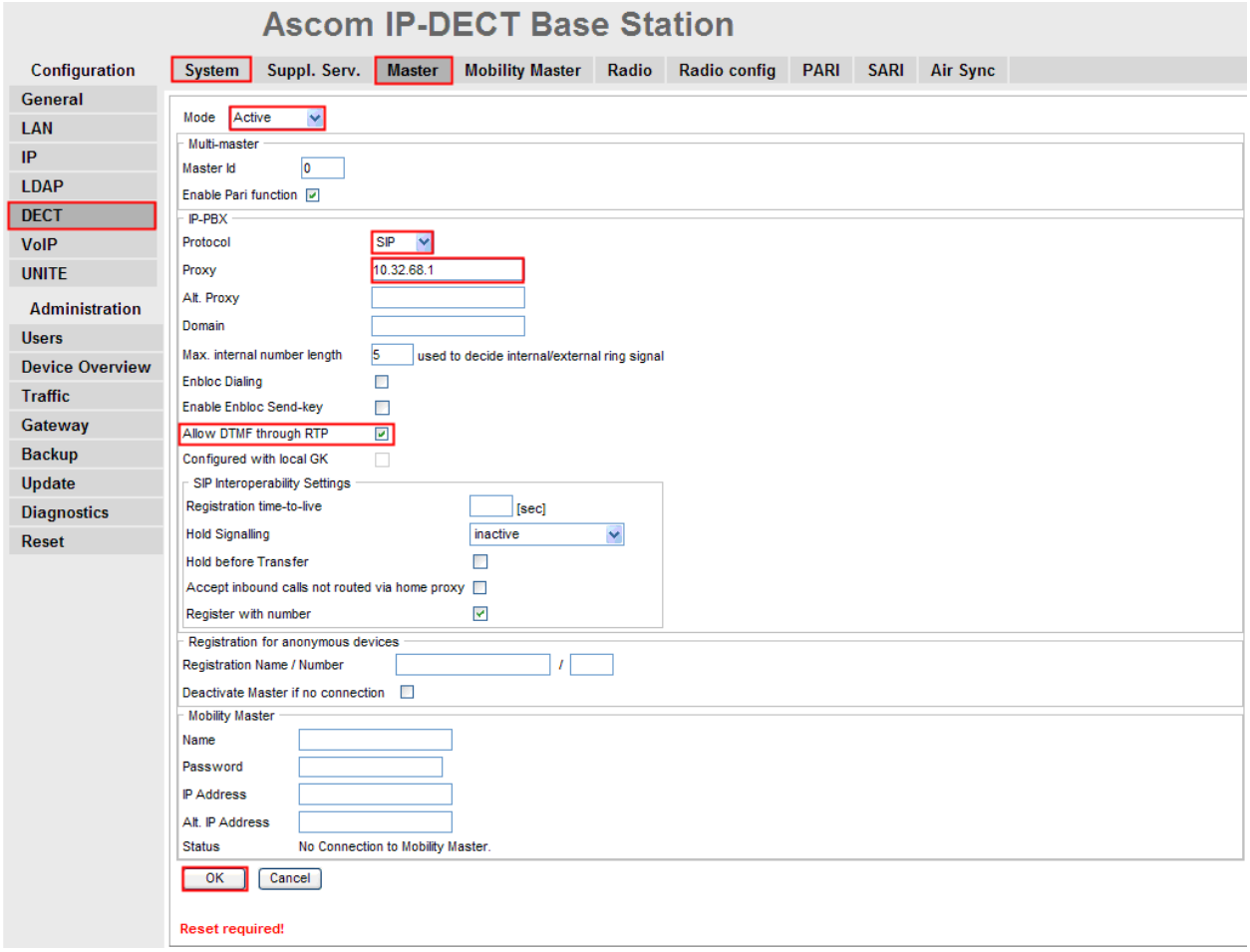
Step	Description
9.	Navigate to the **DECT Master** frame by clicking **DECT** and then clicking **Master**. Configure the fields displayed below and then click **OK**. Use the drop-down list for **Mode** and select "Active". Under **IP-PBX**, use the drop-down list for **Protocol** and select "SIP". Set **Proxy** to the IP address of the Avaya Aura™ Communication Manager Branch (see **Figure 1**). Check the **Allow DTMF through RTP** check box. Click **OK.** Click **System** to continue.



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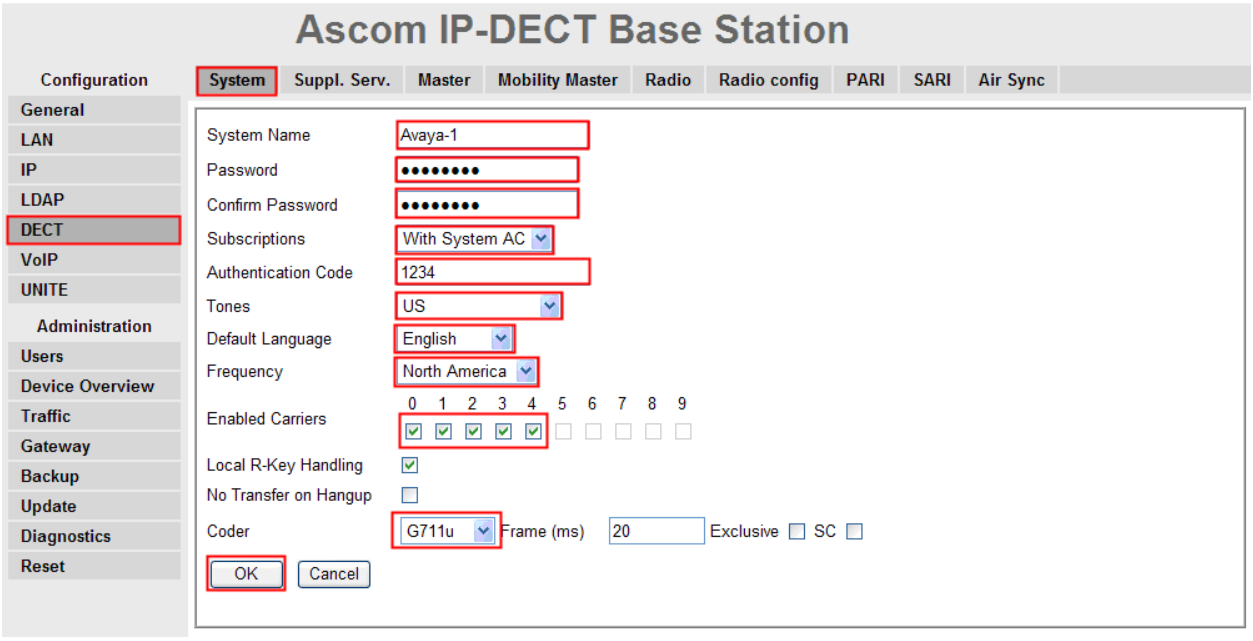
Step	Description
10.	Navigate to the **DECT System** frame by clicking **DECT** and then clicking **System**. Configure the fields displayed below and then click **OK**. **System Name** is the **Device Name** used in **Step 3**. **Password** is the Password used in **Step 3**. The box below **Password** is to confirm the password and the value configured for **Password** field must be entered here. The **Authentication Code** is a numerical code that every DECT handset will need to use to subscribe to this system. Using the drop-down list, **Subscriptions** can be set to "With User AC", "With System AC", or "Disable". In the sample configuration "With System AC" was used. This enables the system to use the **Authentication Code** when challenging DECT handsets during registration. Use the drop-down list for **Tones** and select "US". Use the drop-down list for **Default Language** and select "English". Use the drop-down list for **Frequency** and select "North America". Check the **0**,**1**,**2**,**3** and **4** check boxes. The **Enabled Carriers** check boxes enable the DECT handsets to use different channels or frequencies when transmitting. Use the drop-down list for **Coder** and select "**G711u**". Ensure that the codec chosen matches the codec configured on the Communication Manager Branch. 

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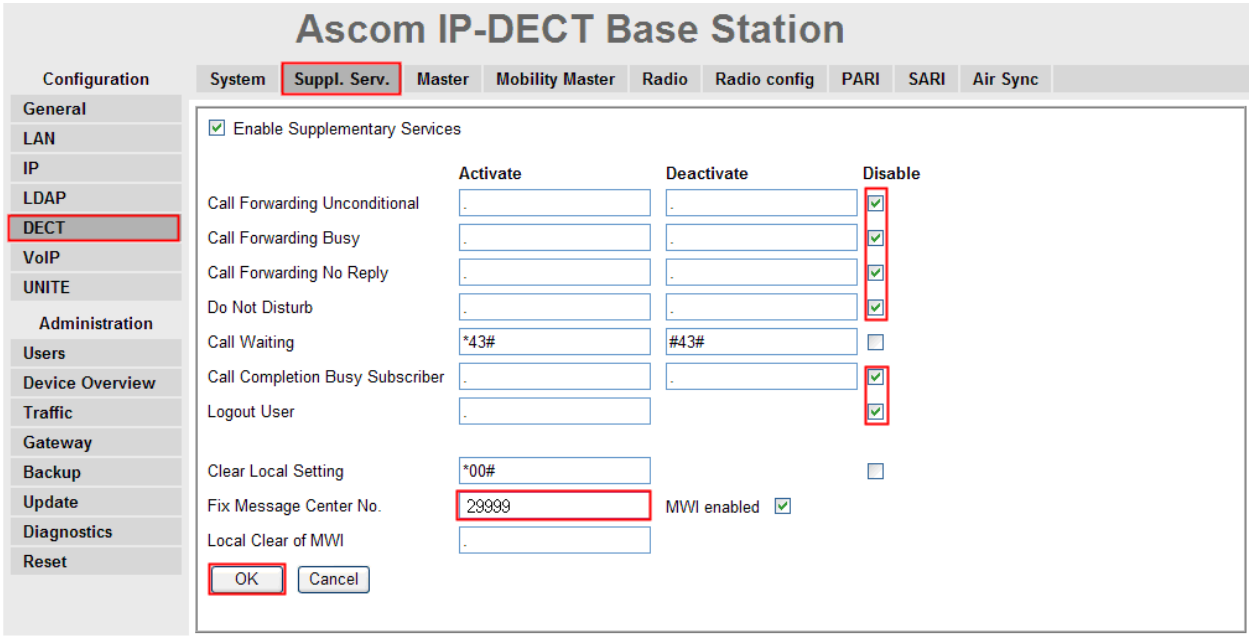
Step	Description
11.	Navigate to the **DECT Suppl. Serv.** frame by clicking **DECT** and then clicking **Suppl. Serv.**. Check the **Enable Supplementary Services** check box. For compliance testing, the Avaya PBX handled most of the features listed, so these functions were disabled on the Ascom Base Station. Disable the following, **Call Forwarding Unconditional, Call Forwarding Busy, Call Forwarding No Reply, Do not Disturb, Call Completion Busy Subscriber** and **Logout User**. Depending on which Voicemail system is being used, enter the extension used for pilot number for voicemail in the **Fix Message Center No.** field, and check the **MWI enabled** check box. Click **OK** to continue. 

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Step	Description
12.	Navigate to the **DECT PARI** frame by clicking **DECT** and then clicking **PARI**. PARI is a user-defined system value and must range from 1-35. Enter any number from 1-35. Click **OK** to continue.
13.	Navigate to the **DECT SARI** frame by clicking **DECT** and then clicking **SARI**. **SARI** is an Ascom provided activation code which is needed for the system to function. Contact Ascom to obtain a **SARI**. Enter the **SARI** value. Click **OK** to continue.

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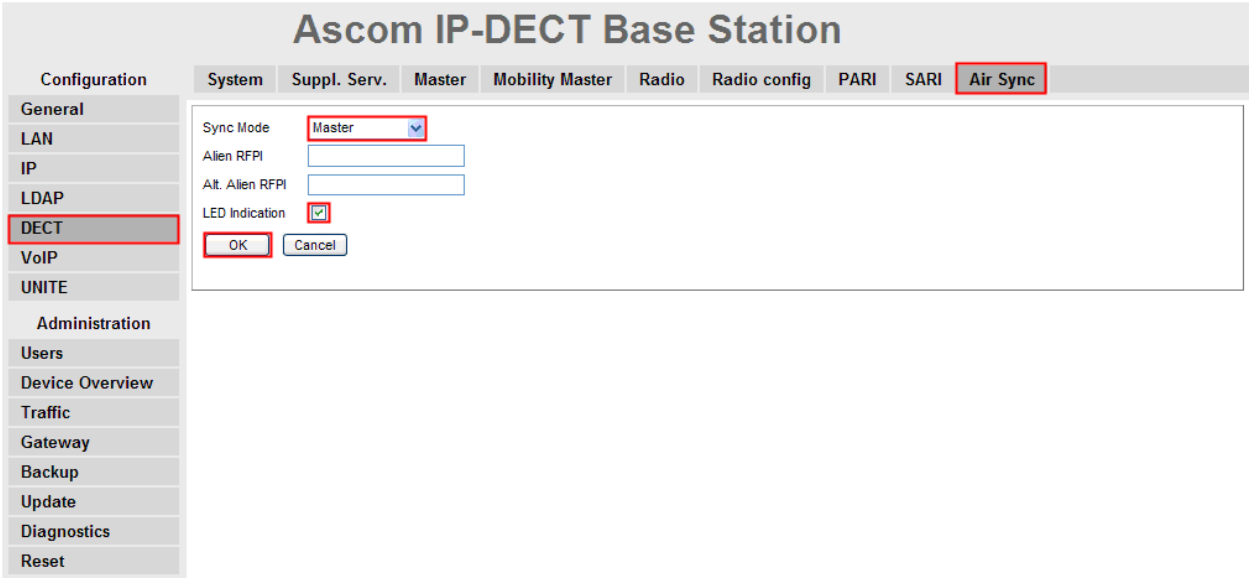
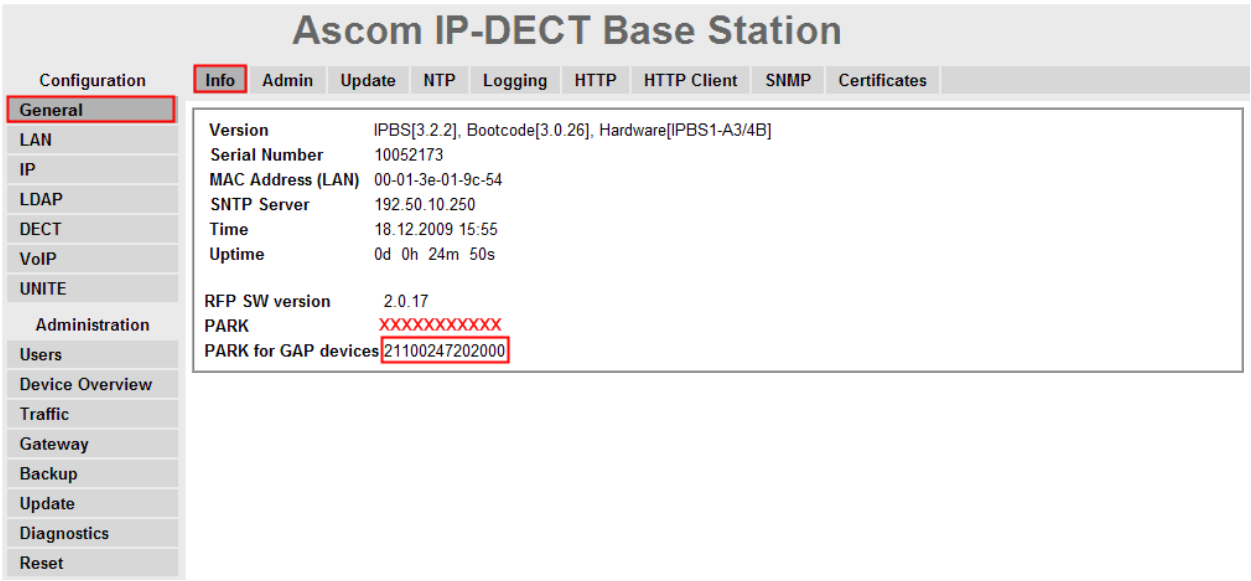
Step	Description
14.	Navigate to the **DECT Air Sync** frame by clicking **DECT** and then clicking **Air Sync**. Use the drop-down list for **Sync Mode** and select "Master". Check the **LED Indication** check box. Click **OK** to continue. 
15.	Navigate to the **General Info** frame by clicking **General** and then clicking **Info**. The **PARK for GAP devices** is displayed. This value is needed when programming Ascom wireless DECT handsets. The **PARK for GAP devices** is similar to an SSID in an 802.11 wireless environment. 

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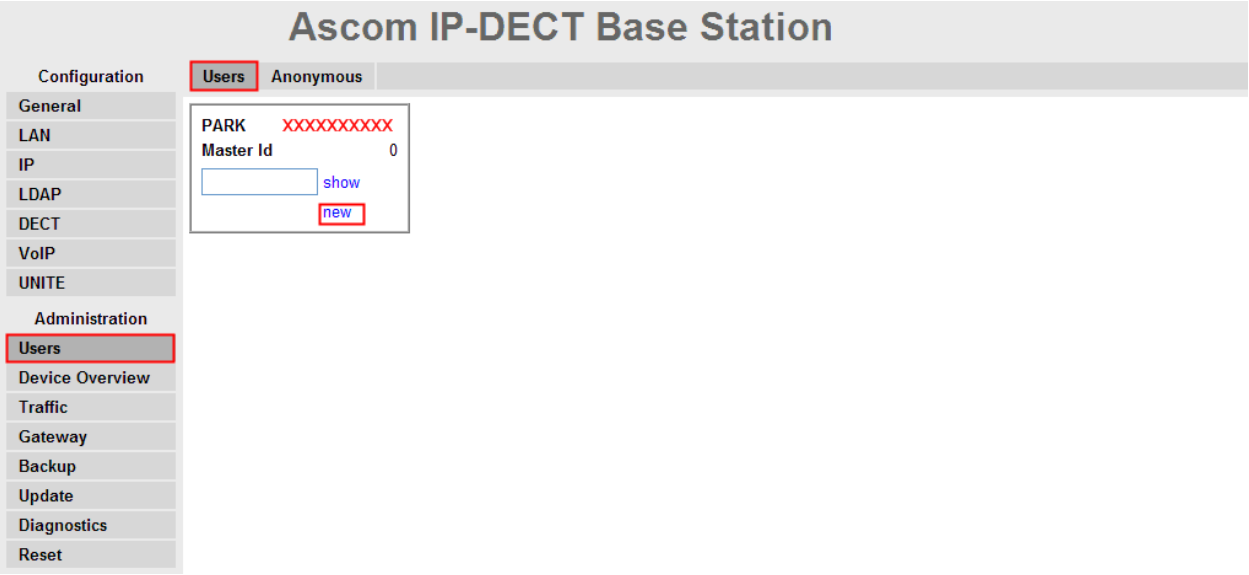
Step	Description
16.	Navigate to the **Users** frame by clicking **Users** and then clicking **Users**. Click **new** to provision a new user account. 

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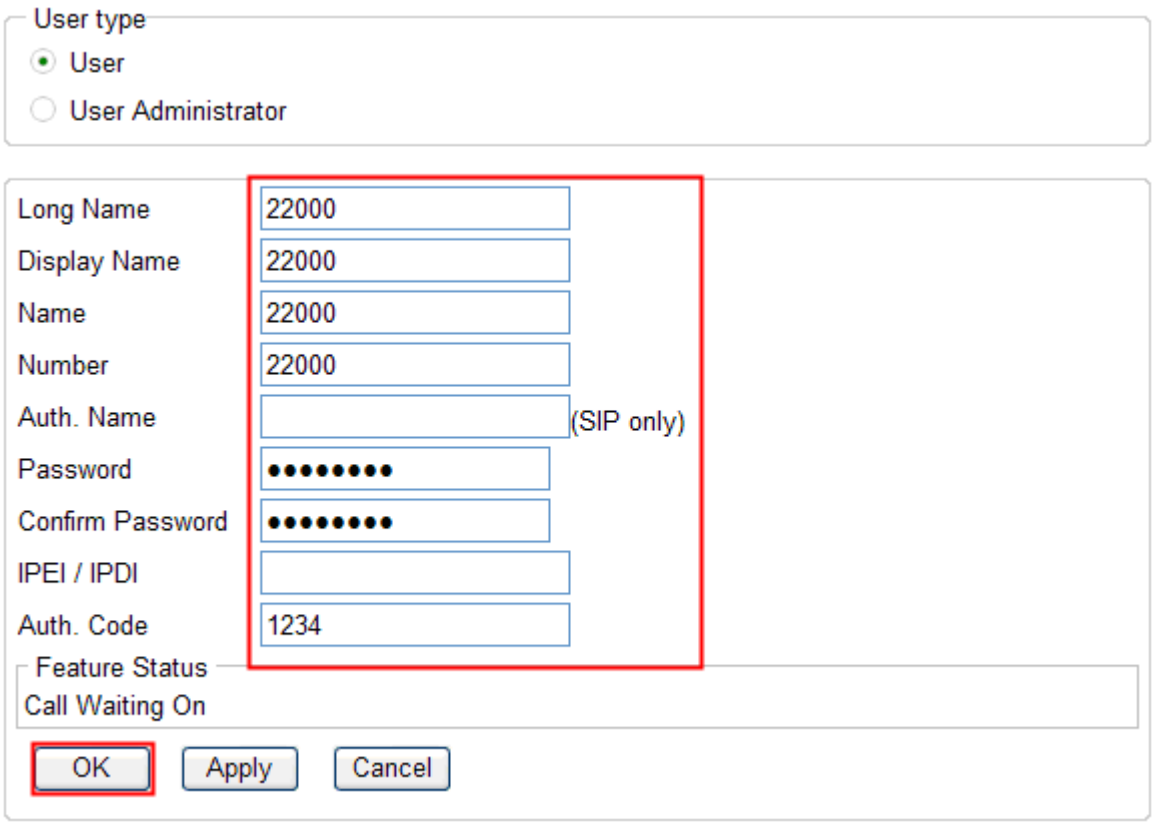
Step	Description
17.	The **Edit User** web page is presented. **Long Name** can be any descriptive name that identifies this user. **Display Name** is the text string that will be displayed on the LCD screen of the Ascom wireless DECT Handset. The **Name** & **Number** fields are the extension assigned to this user. The **Password** field is the password used to register with the Communication Manager Branch. The box below **Password** is to confirm the password and the value entered for the **Password** field must be entered here. **Auth. Code** is used only if **Subscriptions** in **Step 10** is set to "With User AC". Once all the user information has been configured click **OK**. Repeat this process for each user being added to the system. 

5.2. Configure Ascom wireless DECT Handset

Refer to **[4]** to obtain information on the procedures for subscribing and registering the Ascom wireless DECT Handsets to the Ascom wireless IP-DECT Base Station.

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6. General Test Approach and Test Results

6.1. General Test Approach

All feature functionality test cases were performed manually. The general test approach entailed verifying the following:

- Registration, re-registration of Ascom wireless DECT Handsets with Avaya Aura™ Communication Manager Branch.
- Verify G.711MU codec, conference participation, Call forwarding/Call forwarding Deactivate, Call Park/ Call Pickup, Send All Calls/ Send All Calls Deactivate, Message Waiting Indicator and message retrieval from voicemail.
- Inter-office VoIP calls between Ascom wireless DECT Handsets and Avaya SIP & H.323 IP Telephones and Avaya Digital Telephones.
- Roam between multiple Ascom wireless IP-DECT Base Stations using the Ascom wireless DECT Handsets.

6.2. Test Results

The Ascom wireless DECT Handsets passed all test cases. Ascom wireless DECT Handsets were verified to successfully register with Avaya Aura™ Communication Manager Branch. The G.711MU codec was used for testing. Telephone calls were verified to operate correctly and were maintained for durations over one minute without degradation to voice quality. The telephony features verified to operate correctly included transfer (Ascom Feature), hold/return from hold, multiple call appearances, caller ID operation, conference participation, Call Forwarding/Call Forwarding Deactivate, Call Park/Call Pickup, Send All Calls/ Send All Calls Deactivate, bridged appearance alerting, Message Waiting Indicator and message retrieval from voicemail.

7. Verification Steps

7.1. Ascom wireless DECT Handset Registration Verification

The following steps can be used to ascertain the registration state of the Ascom wireless DECT Handsets that the Ascom wireless IP-DECT Base Station is configured to support.

From a web browser, open a connection to the Ascom wireless IP-DECT Master Base Station (see **Section 5.1 Step 1**). Navigate to the **Users** frame by clicking **Users**, then clicking **Users**, and then clicking **show**. A **Registration** state of "Pending" (Not Shown) indicates an Ascom wireless DECT Handset has not registered to the Ascom wireless IP-DECT Base Station. A **Registration** state of "Subscribed" indicates that an Ascom wireless DECT Handset has connected to the Ascom wireless IP-DECT Base Station and requested the use of that particular extension. A **Registration** state that displays the IP Address of the Avaya Aura™ Communication Manager Branch indicates the extension has successfully registered to both the Ascom wireless IP-DECT Base Station and Avaya Aura™ Communication Manager Branch.

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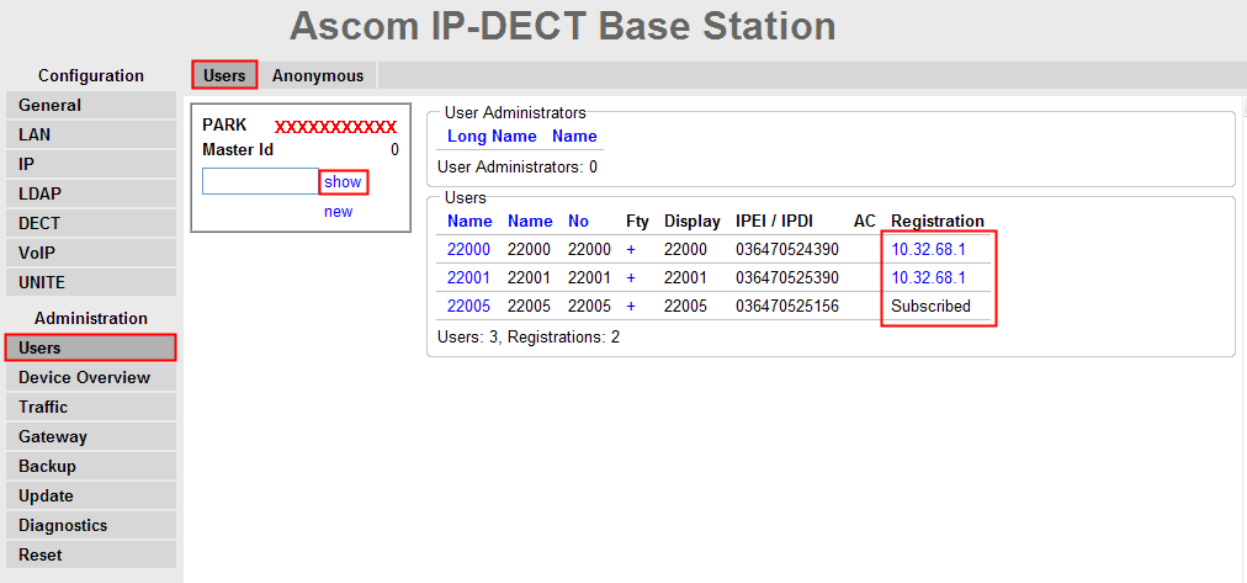

7.2. Ascom wireless DECT Handset Function Verification

The following steps can be used to verify proper operation of the Ascom wireless DECT Handsets.

- Place calls from the Ascom wireless DECT Handsets and verify two-way audio.
- Place a call to the Ascom wireless DECT Handsets, allow the call to be directed to voicemail, leave a voicemail message and verify the MWI message is received.
- Using each Ascom wireless DECT Handset that received a voicemail, connect to the voicemail system to retrieve the voicemail and verify the MWI clears.
- Place calls to the Ascom wireless DECT Handsets and exercise calling features such as transfer and hold.
- The specific calling features that were verified to operate correctly include transfer (attended and unattended), hold/return from hold, multiple call appearances, caller ID operation, call forwarding, call park & pickup, bridged appearance alerting, and voicemail Message Waiting Indicator (MWI).

8. Conclusion

These Application Notes illustrate the procedures necessary for configuring the Ascom wireless IP-DECT SIP Solution comprised of the Ascom wireless IP-DECT Base Station and Ascom wireless DECT Handsets with an Avaya Aura™ Telephony Infrastructure consisting of Avaya Aura™ Communication Manager Branch in a converged Voice over IP and Data Network. All feature functionality test cases described in **Section 6.1** passed.

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9. Additional References

Avaya documentation was obtained from http://support.avaya.com.

[1] *Avaya Installation, Configuration, Troubleshooting, and Programmer's Reference for Avaya Aura™ Communication Manager Branch application enablement (CTI)* - 03-602030
[2] *Avaya one-X Deskphone Edition for 9600 Series IP Telephones Administrator Guide Release 3.0,* Document Number 16-300698.
[3] *Avaya one-X Deskphone SIP for 9600 Series IP Telephones Administrator Guide, Release 2.0,* Document Number 16-601944.

Ascom product documentation.

[4] Ascom product documentation can be found at http://www.Ascomwireless.com

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